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| **Activity 2.2.1 HTML5 and JavaScript** |

Introduction

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| For a website to be successful today, it can’t just look good; it also has to allow for user interaction. JavaScript (not to be confused with Java) has been one of the most popular web programming languages since it was created in 1996. JavaScript turns a static HTML page into an interactive page.  HTML5 integrates HTML more tightly with CSS and | (c) Pinterest |

JavaScript. Although HTML 4 is still common and HTML5 is still under development, many portions of the HTML5 suite are already in common use and the current versions of all browsers implement them. Developed by the World Wide Web Consortium (W3C), the HTML5 standards make it easier for web developers to integrate interactive elements using JavaScript into a webpage. It ensures that web developers can produce content reliably across all different browsers with less work.

What kind of interaction do you like on websites?

Materials

* Computer with…
  + Internet access and Firefox with FireFTP and FireSSH add-ons
  + Notepad++ (Windows), or TextWrangler (Mac)
* Student VPS credentials provided by the teacher.

Procedure

1. Form pairs as directed by your instructor. Meet or greet each other to practice professional skills. Make sure to address:
   1. How you will handle version control
   2. Brain-storming norms

**Part I: W3C, Standards and Protocols Revisited**

1. As noted in an earlier activity, W3C develops many of the standards and protocols for web technologies. They have a process that they follow to ensure that technical specifications and recommendations for technologies are the best they can be. For more in depth information about this process, go to <http://www.w3.org/2005/10/Process-20051014/intro.html>. Read the excerpt below and then fill in the blanks with the appropriate bolded term.

*An* ***Activity*** *organizes the work necessary for the development or evolution of a Web technology. W3C starts an Activity based on interest from the Members and Team.* ***Working Groups*** *typically produce deliverables (e.g., software, test suites, and reviews). There are Good Standing requirements for Working Group participation. The W3C technical report development process is the set of steps and requirements followed by W3C Working Groups to standardize Web technology, specifications and guidelines called* ***technical reports****.*

The W3C advisory committee must review every proposal for a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  . \_\_\_\_\_\_\_\_\_\_\_\_\_ made up of representatives of the W3C membership group, invited experts, and W3C team members work on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ which may involve writing one or more \_\_\_\_\_\_\_\_\_\_\_\_\_. These go through an extensive review process that includes **Requests For Comments** (RFC). At any point in the process a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_ may be terminated.

1. One of the protocols that we will be examining and using further in this lesson is HTTP. An RFC on the technical report containing the method definitions for HTTP can be found at <http://www.w3.org/Protocols/rfc2616/rfc2616-sec9.html>. Here are summaries of two of the most relevant methods to us:

* GET –Send data as requested to the client, such as a web page. The client might provide some data as part of the request in the query string of the URL.
* POST – Accept data from the client, such as a posting a comment on a blog. This is used any time the state of the server will be changed.

Which of these two methods would be used if you were submitting credit card information to amazon.com to complete a purchase?

**Part II: JavaScript Introduction**

JavaScript allows a web page to behave dynamically. The page can change how it appears based on user interaction or other factors. To demonstrate the capabilities and help you to gain some skill working with JavaScript code, we will examine a couple of simple tasks, adding time and browser data to a site, as well as have you add a feature of your own choosing. First you will examine some sites that make good use of JavaScript.

1. Direct your browser to [http://www.creativebloq.com/web-design/examples-of-JavaScript-1233964](http://www.creativebloq.com/web-design/examples-of-javascript-1233964) . You will examine one of the sites in greater detail as directed by your instructor. Summarize what the purpose of the site is and what functionality makes the site engaging.
2. Using your text editor, create a file called **221jssample.html**. Paste the following code into this file and save it. Upload the file to the server using FireFTP as you did in the previous lesson. In a separate tab, load the page in your browser. Use a URL like the following, replacing bkia8cp with your student user name for the server and samplehs with your school’s subdomain.

http://samplehs.pltwcs.org/students/bkia8cp/221jssample.html

|  |  |
| --- | --- |
| 1  2  3  4  5  6  7  8  9  10  11  12 | <!doctype html>  <html lang=”en”>  <head>  <meta charset=”utf-8”>  <title>JavaScript Testbed</title>  </head>  <body>  <h1>  Javascript will find out the date and the browser.  </h1>  </body>  </html> |

What do you see?

1. One technique for learning a new language is to copy and paste various snippets that you find elsewhere into existing code and observe the effects. We’ll take that approach here. If you decide to explore JavaScript more on your own using this method, you’ll eventually come to recognize patterns in the syntax and then, with the help of some online tutorials and official documentation you could become an ace in no time!

The following code for displaying the current time was found at <http://www.quackit.com/javascript/tutorial/javascript_date_and_time.cfm> .

Paste it into your HTML code after the closing </h1> tag.

|  |  |
| --- | --- |
| 10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31  32 | </h1>  <script type="text/javascript">  var currentTime = new Date();  var hours = currentTime.getHours();  var minutes = currentTime.getMinutes();  var suffix = "AM";  if (minutes < 10)  minutes = "0" + minutes;  if (hours >= 12) {  suffix = "PM";  hours = hours - 12;  }  if (hours == 0) {  hours = 12;  }  document.write("<b><div id='d1'>" + hours + ":" +  minutes + " " + suffix + "</div></b>");  </script>  </body> |

Save the file, upload it to the server, and refresh it in the browser tab where you viewed it before.

1. Use the pattern established by lines 4 and 5 of the JavaScript code shown above to add another variable called seconds and store the current number of seconds in it.
2. Modify the document.write command beginning on line 19 so that the number of seconds will also be displayed. Save your code, upload it to the server, and test it by refreshing the tab that you are viewing **221jssample.html** in.
3. **(Step 8 is Optional)** Once you complete Step 8, hit the refresh button again. The time should update when you hit the refresh button but not otherwise. As an extension activity, use the Internet as a resource to determine how to modify this script to update every second displaying the current time.
4. In order to make quality websites that render consistently across browsers it is necessary for web developers to be able to determine what features are available to them. In the past developers would detect the browser type and version directly and make separate pages for each (what a pain!). This was often done through the user agent object and is considered bad practice in all respects.

The Mozilla Developer Network suggests that, whenever possible, developers not use user agent to determine this information but instead detect what features the browser makes available to the code and provide different site functionality dynamically using JavaScript.

The following code taken from <https://developer.mozilla.org/en-US/docs/Using_Web_Standards_in_your_Web_Pages/Developing_cross-browser_and_cross-platform_pages> defines a function to hide any HTML element with a given id. This code could be used with conditional statements to prevent a browser from attempting to render features that it does not support.

Insert this code beginning on line 31 noting that line 38 below is line 31 from Step 6 and line 40 below is line 32 from Step 6.

|  |  |
| --- | --- |
| 29  30  31  32  33  34  35  36  37  38  39  40 | minutes + " " + suffix + "</div></b>");  function hideElement(id\_attribute\_value) {  if (document.getElementById &&  document.getElementById(id\_attribute\_value) &&  document.getElementById(id\_attribute\_value).style  ) {  document.getElementById(id\_attribute\_value).style.visibility = "hidden";  };  }  </script>  <button type="button" onclick="hideElement('d1');">hide div</button>  </body> |

Save your file, overwrite the server copy, and refresh it in the tab you have been using to view the page. Lines 31-33 form a compound conditional statement. It combines three expressions with logical AND (&&). The first expression document.getElementById checks to see if that function is available, if it is not available then that expression would evaluate to false. If it were to return false then the conditional test would **short circuit**. Short circuiting occurs in a logical AND expression when the first condition is false. Since both conditions must be true in order for the whole expression to be true, the program can save itself some execution time by not bothering to evaluate the second condition. Similarly a logical OR (||) expression will evaluate to true if the first condition is true, since it doesn’t matter what the other one is. It is sufficient computationally in that case that the first statement is true.

The expression on line 32 checks to see if there is an element in the document with the given id\_attribute\_value. The final expression on line 33 checks to make sure that the element found in the previous expression has a style. A nice example of short circuiting would be if there were no element with the given id. In that case trying to get that element’s style would produce unexpected results.

Given the following values, at which expression would the following conditional short circuit?

x = 2

y = 3

if (x==2 && y==4 && y >x)

1. Use the Internet to help you add the date to this site.

**Part III: The Design Phase of Web Design**

Throughout this lesson you will begin to learn technical skills and gain knowledge that would allow you to make some truly useful websites for real clients. We’ll focus on one such application of web programming as you explore JavaScript, PHP, and MySQL all of which are commonly used in web development. However, just because we’re examining the creation of an online art gallery, don’t let that hold back your creativity. These same skills could make an online game, store, or social networking site!

1. Imagine that your principal has asked you to create an online gallery for the display of student artwork. They would like users to be able to search for student artwork by a variety of criteria and have the site display only images that meet those criteria. The site should have a login for art students that allows them to upload pictures and information about the pieces in those pictures as well as entering or changing their personal information. The web site may consist of multiple different pages.

Keep in mind the principles of HCI, Human Computer Interaction, discussed in previous lessons, and shown below, as you develop a design plan for this website with your partner. You do not need to be concerned with any of the details of coding this website at this point in the activity.

* 1. Structure: The interface should be organized, putting related elements together.
  2. Simple: Common tasks should be easy.
  3. Visible: Information and options should be easy to find, without the distraction of unnecessary information.
  4. Feedback: User should be informed of actions, changes in state, and errors.
  5. Tolerance: Mistakes should be easy to undo and reasonable input should be interpreted.
  6. Reuse: Design should be consistent across components.

Here are some questions that may help you get started through the design process. Your instructor may ask you to record answers to these in an Engineering Notebook:

* + 1. How many pages will your site be made of?
    2. What will be the primary function of each individual page?
    3. How will your user navigate between pages?
    4. How will information about images and pieces be displayed?
    5. What information about images, pieces, and/or artists will be displayed?
    6. Where will they be displayed?
    7. How will the different parts of your site look?
    8. What criteria should a user be able to search for images by?
    9. How will they enter those criteria?
    10. Draw a sketch of what your site would look like.

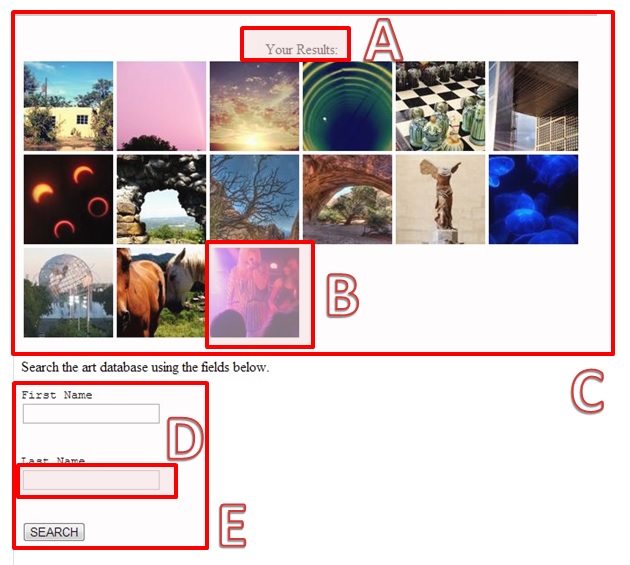
1. As directed by your instructor, share with at least two other pairs the ideas that you came up with for the design of the website and create a list of the best qualities from all three of your groups.
2. You will now brainstorm as a class to produce even more design ideas. Follow the procedure laid out in the following sub-steps.
3. As Directed by your teacher, share your list of best ideas from Step 12 with the whole class.
4. Boggle rules award the most points to unique ideas, but only after the class has agreed on the common ideas that everyone has had. Brainstorming rules advise that at this point Piling On Ideas to make as large of a list as possible is best. Do not provide feedback on ideas at this point to avoid ruling any out.
5. Once a whole class list of ideas has been generated then a discussion of the advantages and disadvantages of each can be had. Use the **Scrum poker** ideal of assigning two values to each idea (First Value is the difficulty to code the idea, second value is the monetary value of the Idea). In Scrum poker, each participant produces a value in private and then all participants reveal their values to the whole group, this helps to avoid bias. Use a scale of 1-10 with 10 representing the highest difficulty for the first value and the most potential for financial gain for the second value.
6. Use Scrum poker as directed by your instructor to determine which ideas you would focus on to develop a successful website. Prioritize ideas that are easy to program and result in the most monetary value.
7. Name one company in your area that would need people on staff who are able to handle the design phase of a website. If you are having difficulty, use the Internet to find a local company that has a website… at some point they had to communicate ideas to a web developer about design.

**Part IV: Analyzing a Web Site**

1. Now you’ll take a look at a version of an online art gallery in order to better understand the usefulness of dynamic web languages. To set up the web sites that you’ll be examining on your local machine follow these steps:
2. Get a copy of the folder **2.2.1.A source** as directed by your instructor, they will have different instructions for you depending on whether they are storing this set of resources as a zipped archive or as a folder.
3. Open the copy of **221indexA.html** that you find there in a web browser.
4. Open the source for this file. You may do this in your browser (Ctrl+U in Firefox and Chrome, F12 in IE), or in the text editor of your choice. What languages are used to write the code that you see?
5. Answer the following questions as you test out this site:
6. What can you see?
7. What can you do?
8. What notable functions are missing from the site (don’t forget to consider HCI and access concerns)?
9. Look at the code for the site. Rate each line of code on a 1 to 5 scale as follows:
10. I know what this line of code is and could have thought of it on my own.
11. The line makes sense when I read it but would have been difficult for me to come up with on my own.
12. This line of code makes no sense to me.

Once you have rated all of the code, describe what kind of code makes sense to you (1 or 2) and what does not (3, 4, or 5).

1. We’ll need to quickly review HTML so that you know which parts of the web page are being affected by functionality that we add later. Using the images below, write the tag or tags that tell the browser to render the highlighted areas of this page.



1. The text reading “Your results:”
2. The image of the concert

1. The entire table containing the heading and images

1. The form input text box under “Last Name”

1. The form
2. **221indexB.html** contains a modified version of this site with added functionality. Here you will see some of the effects that using more advanced web languages can have. Repeat the actions in Step 15 for **221indexB.html** and then answer the following questions.
3. What happens when you mouse over the image in the upper left?
4. What languages were used to develop this version of the site and what, in broad terms, is the role of each? (Hint: look at the code)

**Language 1:**

**Role of Language 1:**

**Language 2:**

**Role of Language 2:**

**Language 3:**

**Role of Language 3:**

**Part V: Modifying a Web Site - JavaScript**

1. The introduction of JavaScript, not to be confused with Java, to this page has allowed for some degree of interactivity. JavaScript is a **client-side scripting language**. What this means is that much of the functionality added by JavaScript is handled by the browser on the user’s computer, without having to make additional GET requests to the server. Of course server requests are needed when JavaScript executes code that demands server data like image requests or MySQL queries.
2. You could achieve similar functionality to what you observed in step 18, part a, using only HTML (no JavaScript). For example you might have the image link to a new page that is mostly the same as the first. How would the new page differ?
3. This could be a lot of extra work for the server. Why might this be an issue?
4. Modify this website so that there is a popout for three more images on the page, similar to the one that appears when you mouse over **pic1thumb.jpg**. How much work would it be to modify all the images on the page in the same way? When you are done, what did you notice about the amount of work you needed to do in order to accomplish this task?

**Part VI: The Limitations of Client-Side Scripting**

1. In following activities you’ll learn to use code to automate the creation of pages like this. If we wanted to add an additional page with images from another artist, it would mean replicating a lot of the coding that you did in this lesson which could be a minor pain. How much, and what kind of extra work would it be to create a page like this for every art student in your school in this manner?

**Conclusion**

1. What do you see as some of the advantages of using a client-side scripting language like JavaScript?
2. What kind of improvements could you make to this page using CSS and HTML?
3. Your favorite shopping websites likely uses POST or a similar method to send information back to a server allowing purchases. This technology has been responsible for major changes in the way we do business. Use the Internet to research trends in **e-commerce** (buying and selling of goods online) since 1999 and give a summary report of your findings here. You may use the following link to help you get started: <http://www.ecommerce-land.com/history_ecommerce.html>
4. What do you see as the advantages and disadvantages of using only HTML and CSS to create a website as opposed to including JavaScript?
5. What do you see as the advantages and/or disadvantages of choosing a career in web design?